Surround Cinema

SUB200

Amplifier/Subwoofer

SERVICE MANUAL

JBL Consumer Products
250 Crossways Park Dr.
Woodbury, New York 11797

Rev1 3/2005

Note: The SUB200 is part of the SCS200.7 system

Satellite loudspeakers SCS200SAT order JBL part# SCS200SAT-1
Center channel SCS200CEN order JBL part# SCS200/300 CEN-1

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BASIC SPECIFICATIONS

SUB200 Subwoofer

Configuration:	Floor-firing, bass-reflex ported enclosure
Woofer:	8" (203mm) cone
Amplifier Power output:	100W Continuous RMS power
Frequency response:	35Hz – 160Hz (-6dB)
Dimensions (including feet):	16 ¼ x 11 x 13 ¾" (413 x 279 x 349mm)
Weight:	28 lb/12.7kg

Occasional refinements may be made to existing products without notice but will always meet or exceed original specifications unless otherwise stated

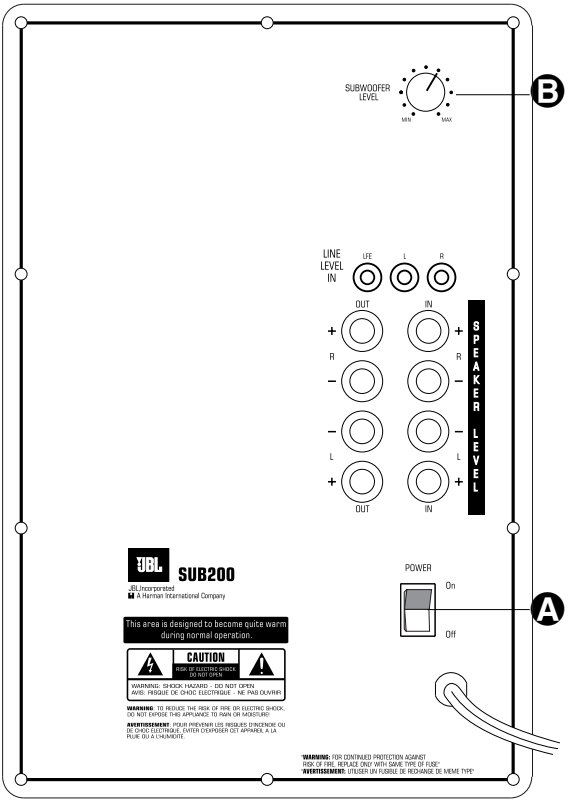
JBL SUB200 100W Powered Sub/ Plate Amp					
LINE VOLTAGE	**Yes/No**	**Hi/Lo Line**	**Unit**	**Notes**	
US 120VAC/60Hz	Yes	108-132	Vrms	Normal Operation	
Asia 100VAC/50Hz	Yes	90-110	Vrms	Normal Operation	
EU 230VAC/50-60Hz	Yes	207-264	Vrms	Normal Operation	Normal operation, MOMS required
Parameter	**Specification**	**Unit**	**QA Test Limits**	**Conditions**	**Notes**
Amp Section					
Type (Class AB, D, other)	AB	AB	N/A		120V System is Class AB
Type (Class AB, D, other)	H	H	N/A		230V System is Class H
Load Impedance (speaker)	4	Ohms	N/A	Nominal	
Rated Output Power 120V	100	Watts	85	@ Nominal input voltage	Different output power due to differences in amp configuration between 120V and 230V
Rated Output Power 230V	105	Watts	100	@ Nominal input voltage	
THD@ Rated Power	0.5	%	1	22K filter	
THD @ 1 Watt	0.1	%	0.3	22K filter	
DC Offset	10	mV-DC	50	@ Speaker Output	
Damping factor	>100	DF	50		Measured at speaker terminals, Output power 90 Watts THD 0.1 %
Input Sensitivity					
Input Frequency	50	Hz	50	Nominal Freq.	
Line Input (L&R)	15	mVrms	±2dB	To 1 Watt	1 input driven
LFE Input	9.5	mVrms	±2dB	To 1 Watt	LFE input driven only
Speaker/Hi Level Input	245	mVrms	±2dB	To 1 Watt	(-20 dB below Line In)...1 input driven
Signal to Noise					
SNR-A-Weighted	90	dBA	85	To Rated power	A-Weighting filter
SNR-unweighted	80	dBr	80	To Rated power	22KHz filter
SNR @ 1W-unweighted	65	dBr	60	To 1 Watt	22KHz filter
Residual Noise Floor	1.5	mVrms	2.5	Volume @max, using RMS reading DMM/VOM (or A/P)	
Residual Noise Floor	1	mVrms(max)	2	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics)	
Input Impedance					
Line input L&R , LFE	>10	K ohms	N/A	Nominal over the audio BW	Reference only
Speaker/Hi Level Input	4.7	K ohms	N/A	Nominal over the audio BW	Reference only
Filters					
Low Pass (fixed or variable)	fixed	--	±2dB		
Slope & Q		dB/Octave	N/A		
Subsonic filter (HPF)		Hz	±2dB		
Slope & Q		dB/Octave	N/A		
Limiter (yes/no)	YES	--	N/A		
THD at Max. Output Power	N/A	--	N/A		
Features					
LFE Input	YES		Functional		BW Limited to 500 Hz, refer to ECR00031 & AP Curves
Volume pot Taper (lin/log)	LOG	--	Functional		
ATO	YES		Functional		
Input Configuration					
Line In (L,R)	L ,R	--	Functional		RCA inputs: L , R Summed to Mono
Line level in LFE	LFE		Functional		
Spkr/Hi Level In (L,R)	L,R	--	Functional		L R Summed to Mono
Spkr Out: Level out (L,R)Hi F	L,R		Functional		Direct by pass from Speaker in
Signal Sensing (ATO)					
Auto-Turn-On (yes/no)	YES	--	Functional		
ATO Input Frequency	50	Hz	Functional		
ATO Level Line Level in (L,R	2	mV	Functional	2mV@50Hz into Line Input w/ 1 ch. driven	
ATO Level Speaker in	40	mV	Functional		

Parameter	Specification	Unit	QA Test Limits	Conditions	Notes
ATO Turn-on time	5	ms	Functional	Amp connected and AC on, then input signal applied	
Auto Mute/ Turn-OFF Time	15	minutes	Functional	T before muting, after signal is removed	Auto turn of time (T) must be 10 > T <15
Power on Delay time	3	sec.	Functional	AC Power Applied	
Transients/Pops					
ATO Transient	5	mV-peak	10	@ Speaker Outputs	
Turn-on Transient	50	mV-peak	100	@ Speaker Outputs	AC Line cycled from OFF to ON
Turn-off Transient	50	mV-peak	100	@ Speaker Outputs	AC Line cycled from ON to OFF
Efficiency					
Stand-by Input Power	12	Watts	13	@ nom. line voltage	Maximum allowable input power under nominal Input voltage and frequency, HOT or COLD operation.
Power Cons.@rated power	180	Watts	187	@ 120V-60 Hz (Nom.line voltage)	90 Watts @ 4 Ohms nominal line voltage
Power Cons.@rated power	195	Watts	200	@ 230V-50 Hz (Nom.line voltage)	90 Watts @ 4 Ohms nominal line voltage
Protection					
Short Circuit Protection	YES	--	Functional	Direct short at output	
Thermal Protection	65 deg. C	--	Functional	@1/8 max unclipped Power	Temperature rise should not exceed 35K rise
DC Offset Protection	YES	--	Functional	DC present at Speaker Out leads	Relay or crowbar (for driver/fire
Line Fuse Rating					
120VAC	2.5	Amps		Type-T or Slo Blo	External fuse with UL/SEMKO rated holder
230VAC	1.25	Amps		Type-T or Slo Blo	External fuse with UL/SEMKO rated holder

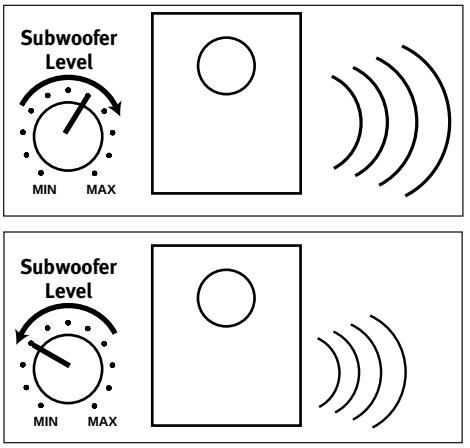
OPERATION

Move the Master Power switch (marked "Power" Ⓐ) to the "•" (On) position to use the SUB200 subwoofer.

If you will be away from home for an extended period of time, or if the subwoofer will not be used, switch the Master Power switch Ⓐ to the Off position.

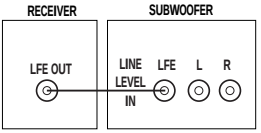


VOLUME



Volume may be adjusted using the Subwoofer Level control Ⓑ as shown.

DOLBY* DIGITAL OR DTS®
(OR OTHER DIGITAL SURROUND MODE) CONNECTION



Use this installation method for Dolby Digital, DTS or other digital surround processors:

Use the line-level input jack marked “LFE” for the Low-Frequency Effects channel.

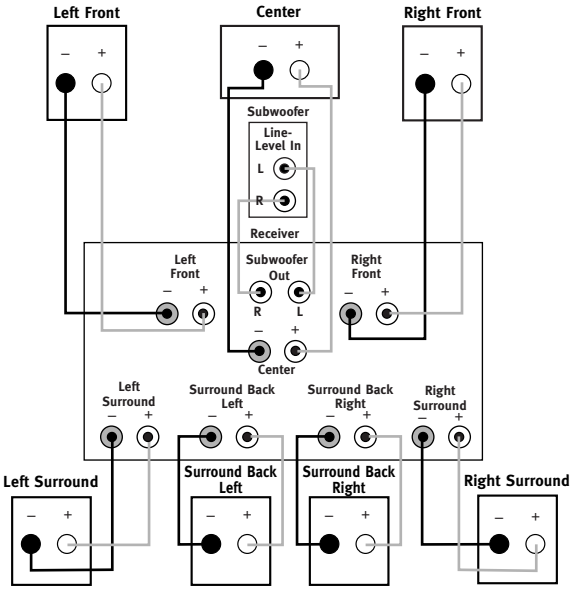
Connect this jack to the LFE output or subwoofer output on your receiver or amplifier. Connect each speaker to the corresponding speaker terminals on your receiver or amplifier.

Make sure that you have configured your surround sound processor for “Subwoofer On.” Also configure your receiver for 5.1-, 6.1- or 7.1-channel operation as appropriate. The front left, front right, center and rear speakers should all be set to “Small.” If your receiver allows you to set the crossover frequency between the subwoofer and the main speakers, select 120Hz or the setting that is the closest frequency below it.

DOLBY PRO LOGIC* (NON-DIGITAL) – LINE LEVEL

Use this installation method for Dolby Pro Logic applications (not Dolby Digital, DTS or other digital processing), where the receiver/processor is equipped with a subwoofer output, or a volume-controlled preamp (line-) level output:

Use RCA-type interconnects to connect the line-level subwoofer outputs on your receiver or amplifier to the line-level inputs on the subwoofer. IMPORTANT: Do not use the LFE input on the subwoofer with Dolby Pro Logic processors.



NOTE: If your receiver or amplifier only has one subwoofer output jack, then you will need to use a Y-connector (not included). Plug the male end of the Y-connector into your receiver or amplifier’s subwoofer output jack, and connect each of the two female ends to separate RCA-type interconnects. Finally, plug the RCA-type interconnects into the line-level inputs on the subwoofer.

Connect each speaker to the corresponding speaker terminals on your receiver or amplifier.

Make sure your receiver or processor is correctly configured to indicate that the subwoofer is “On.”

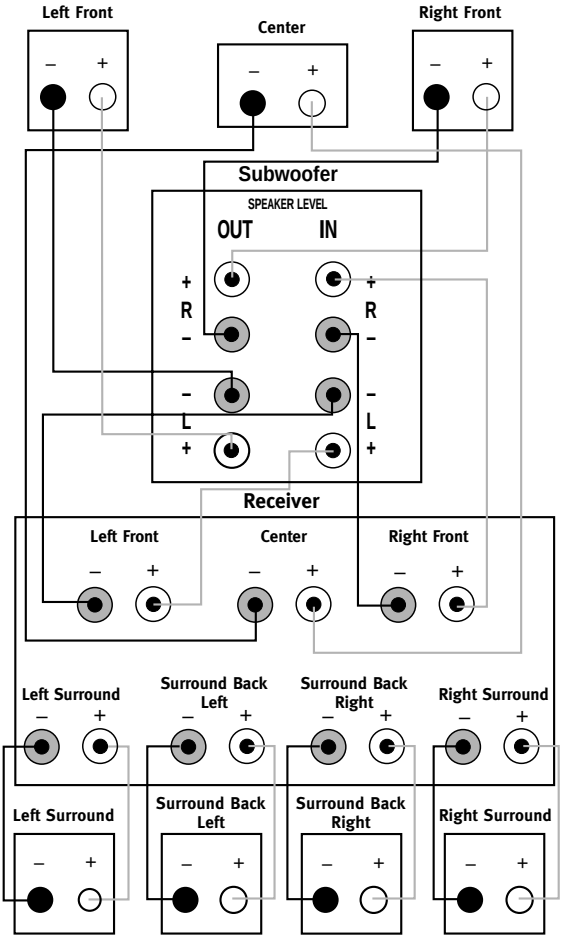
Note for advanced users: If your receiver/processor has a built-in low-pass crossover filter for the subwoofer output, you may use the LFE input to bypass the subwoofer’s internal crossover.

DOLBY PRO LOGIC (NON-DIGITAL) – SPEAKER LEVEL

Use this installation method for Dolby Pro Logic applications (not Dolby Digital, DTS or other digital processing), where the receiver/processor does not have a subwoofer output, or a volume-controlled preamp (line-) level output:

Connect your receiver or amplifier's front left and right speaker terminals to the left and right terminals on the subwoofer that are marked "Speaker Level In." Connect the left and right terminals on the subwoofer that are marked "Speaker Level Out" to the corresponding terminals on the back of your front left and right speakers.

Connect your receiver or amplifier's center, surround and surround back speaker terminals to the corresponding terminals on the back of your center and surround speakers.



TROUBLESHOOTING

If there is no sound from any of the speakers:

• Check that receiver/amplifier is on and a source is playing.

• Check that the powered subwoofer is plugged in, and its Power switch Ⓐ is switched on ("•" position).

• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other.

• Review proper operation of your receiver/amplifier.

If there is no sound coming from one speaker:

• Check the "Balance" control on your receiver/amplifier.

• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other.

• In Dolby Digital or DTS modes, make sure that the receiver/processor is configured so that the speaker in question is enabled.

• Turn off all electronics and switch the speaker in question with one of the other speakers that is working correctly. Turn everything back on, and determine whether the problem has followed the speaker, or has remained in the same channel. If the problem is in the same channel, the source of the problem is most likely with your receiver or amplifier, and you should consult the owner's manual for that product for further information. If the problem has followed the speaker, consult your dealer for further assistance or, if that is not possible, visit www.jbl.com.

If there is no sound from the center speaker:

• Check all wires and connections between receiver/amplifier and speaker. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other.

• If your receiver/processor is set in Dolby Pro Logic mode, make sure the center speaker is not in phantom mode.

• If your receiver/processor is set in one of the Dolby Digital or DTS modes, make sure the receiver/processor is configured so that the center speaker is enabled.

If the system plays at low volumes but shuts off as volume is increased:

• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other.

• If more than one pair of main speakers is being used, check the minimum impedance requirements of your receiver/amplifier.

If there is low (or no) bass output:

• Make sure the connections to the left and right "Speaker Inputs" have the correct polarity (+ and –).

• Make sure the subwoofer is plugged into an active electrical outlet, and is turned on (Power switch Ⓐ in the "•" position).

• In Dolby Digital or DTS modes, make sure your receiver/processor is configured so that the subwoofer and LFE output are enabled.

If there is no sound from the surround speakers:

• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other.

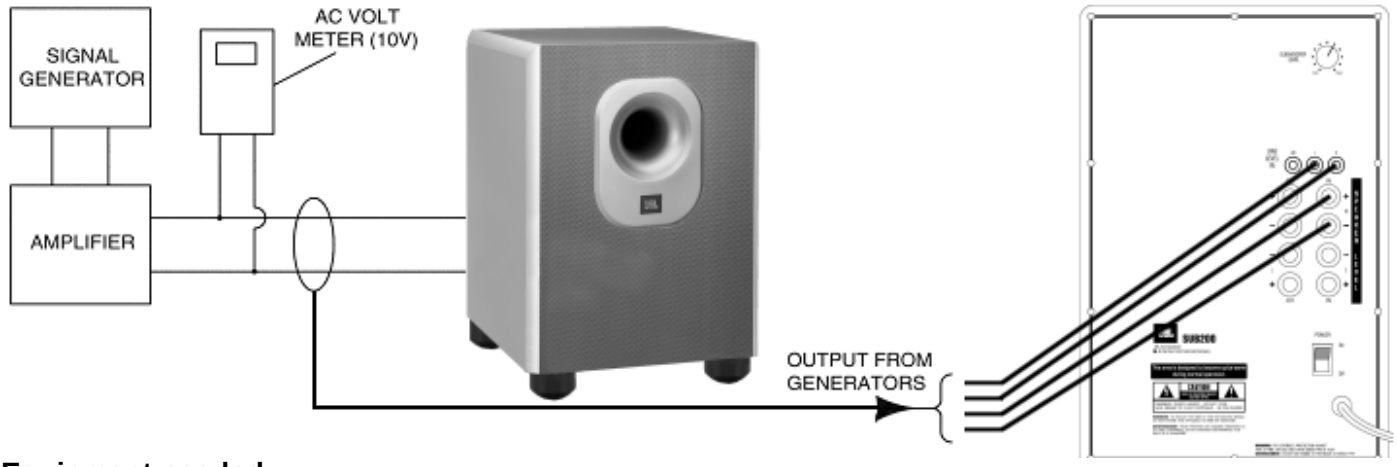
• Review proper operation of your receiver/amplifier and its surround sound features.

• Make sure the movie or TV show you are watching is recorded in a surround sound mode. If it is not, check to see whether your receiver/amplifier has other surround modes you may use.

• In Dolby Digital or DTS modes, make sure your receiver/processor is configured so that the surround speakers are enabled. When five satellites are in use, remember to configure your receiver or processor for 6.1-channel operation, and when all six satellites are in use, configure your receiver or processor for 7.1 channels.

• Review the operation of your DVD player and the jacket of your DVD to make sure that the DVD features the desired Dolby Digital or DTS mode, and that you have properly selected that mode using both the DVD player's menu and the DVD disc's menu.

SUB200 Test Set Up and Procedure



Equipment needed:

- Function/signal generator/sweep generator
- Integrated Amplifier
- Multimeter
- Speaker cables

General Unit Function (UUT = Unit Under Test)

1) From the signal generator, connect one line level (RCA) cable to the Subwoofer Line Level Input jacks L/R on the UUT. Use a Y-cable from a mono source if necessary to connect to both inputs. Do not connect to the single LFE input.
2) Turn the LEVEL control on the UUT to completely counterclockwise (MIN).
3) Turn on generator; adjust to **100mV, 50 Hz**.
4) Plug in UUT; turn the power switch ON. LED should switch from Red to Green. Turn LEVEL control full clockwise (MAX)
5) LED should Green; immediate and vigorous bass response should be heard and felt from port tube opening.
6) Turn off generator, turn LEVEL control full counterclockwise (MIN), and disconnect RCA cable.
7) Connect one pair of speaker cables to Speaker Level input terminal (IN) on UUT. Cables should be connected to an integrated amplifier fed by the signal generator.
8) Turn on generator and adjust so that speaker level input at the amplifier is **2.0V, 50 Hz**. Turn LEVEL control full clockwise (MAX).
9) Green LED should light; immediate and vigorous bass response should be heard and felt from the port tube opening.

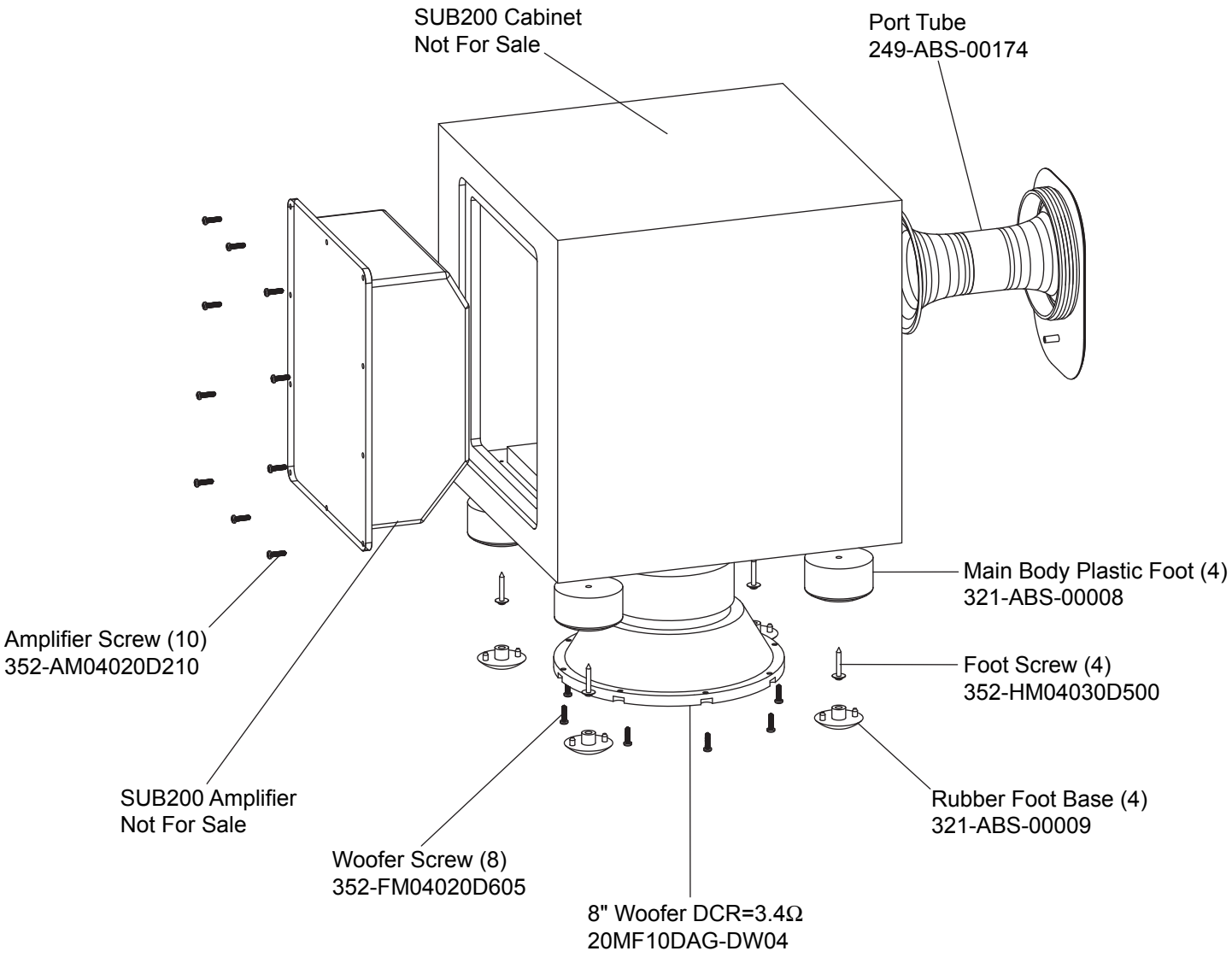
Sweep Function

1) Follow steps 6-8 above, using a sweep generator as a signal source.
2) Sweep generator from 20Hz to 300Hz. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove woofers and test.

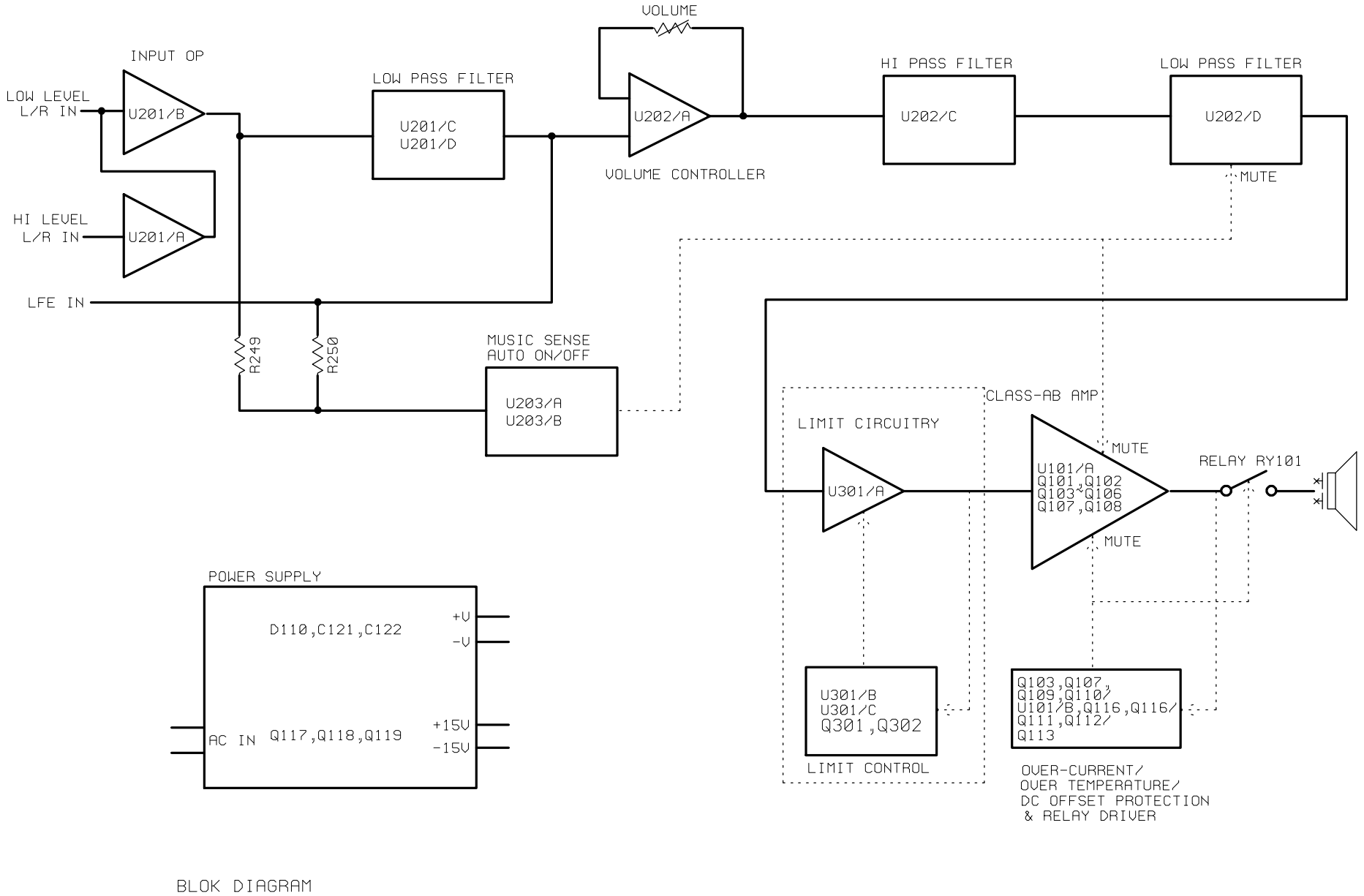
Driver Function

1) Remove woofer from cabinet (instructions on exploded view drawing); detach + and - wire clips.
2) Check DC resistance of woofer; it should be **3.4 ohms** ±10%
3) Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal generator. Turn on generator and adjust so that speaker level output is **5.0**V.
4) Sweep generator from 20Hz to 1kHz. Listen to driver for any rubbing, buzzing, or other unusual noises.

SUB200
Exploded View

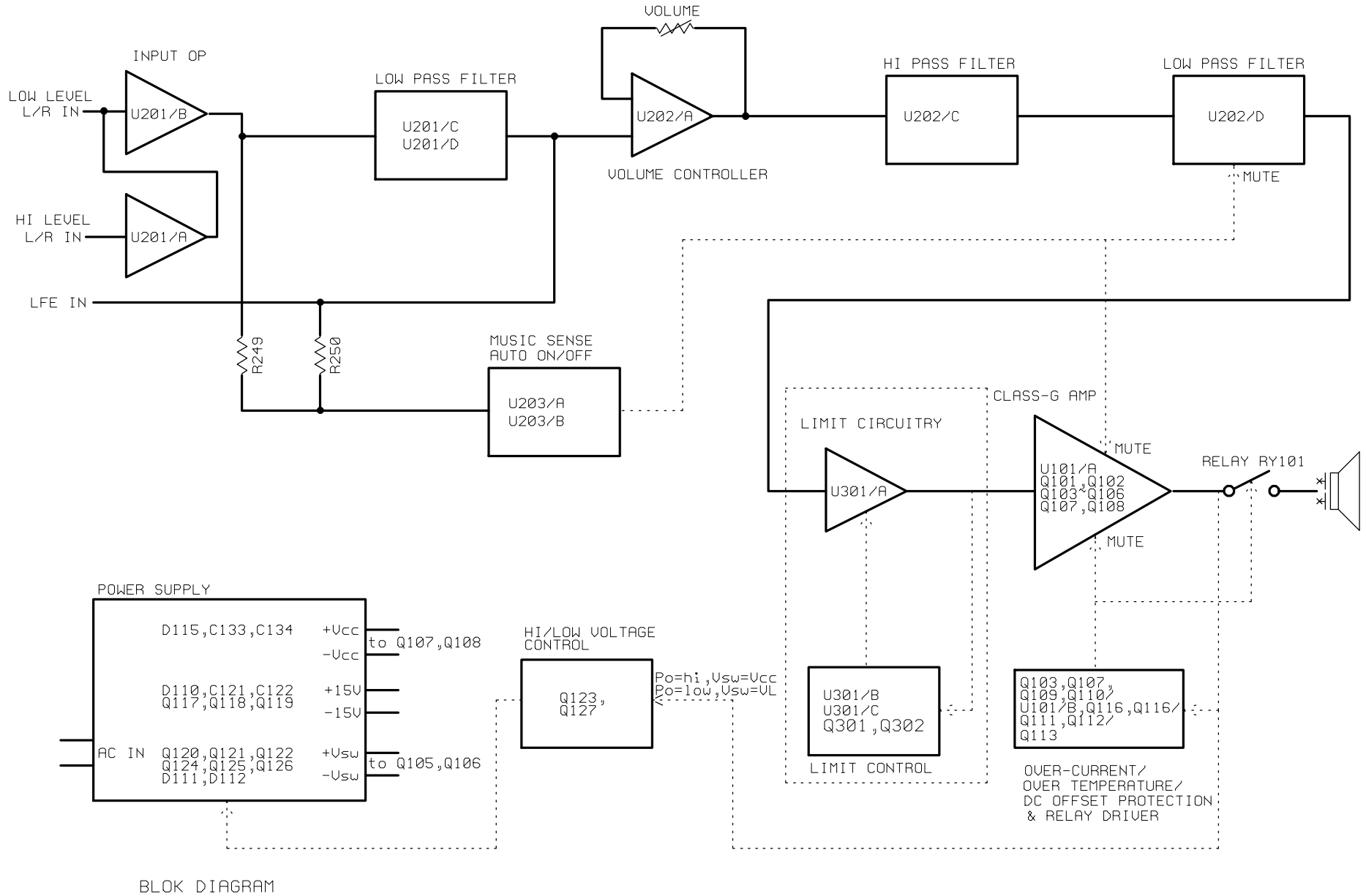


SUB200 120v BLOCK DIAGRAM

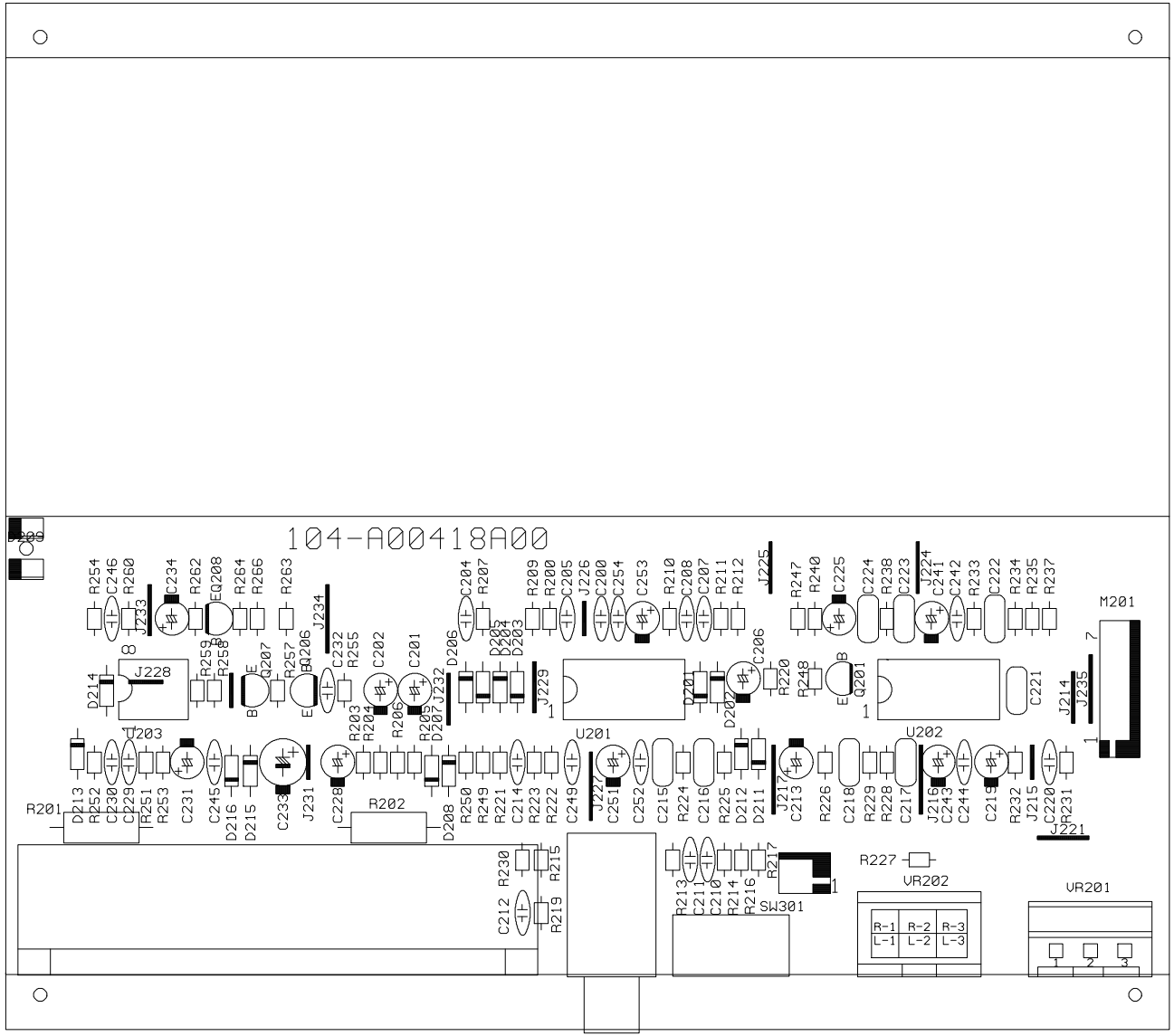


BLOK DIAGRAM

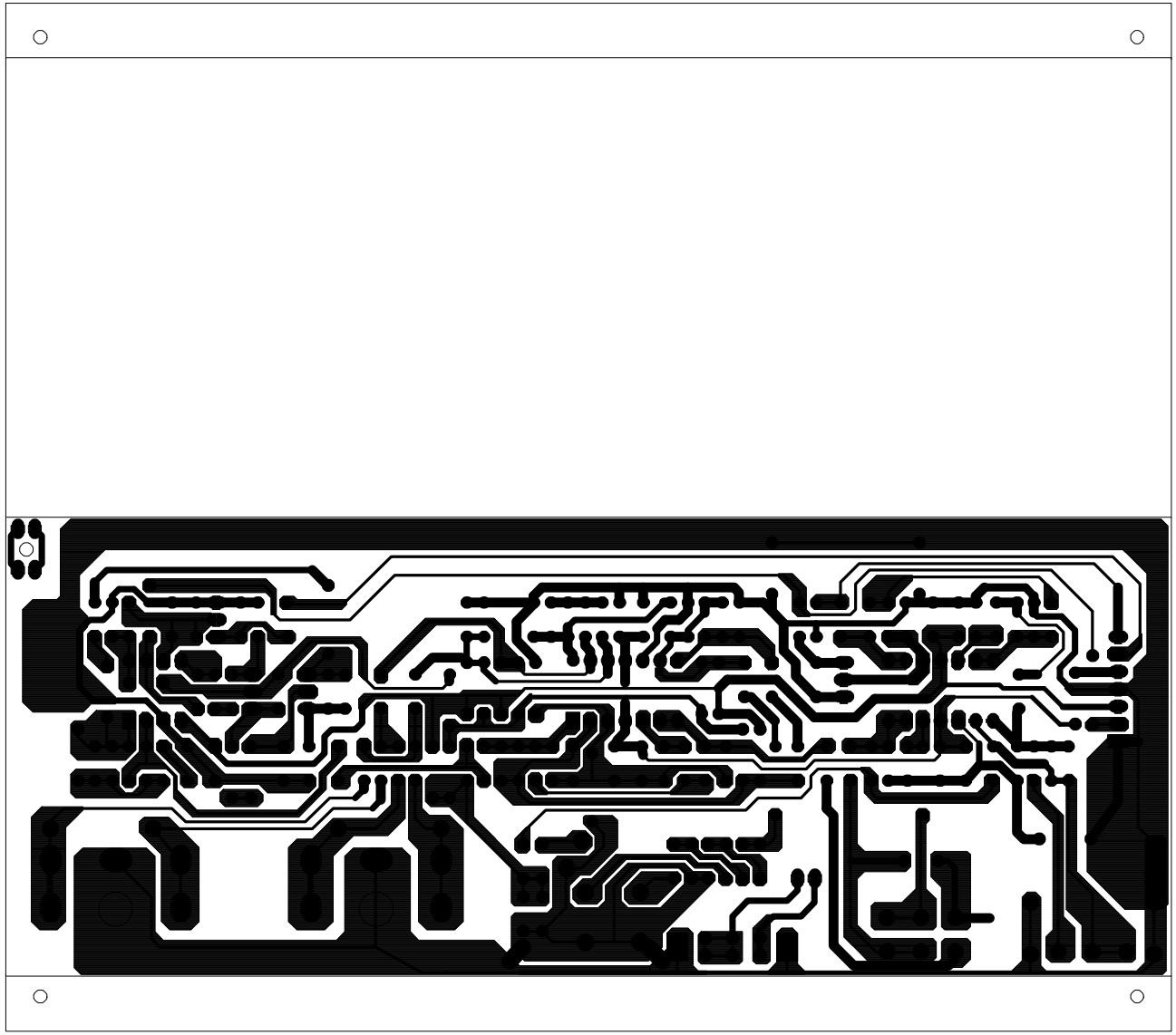
SUB200 230v BLOCK DIAGRAM



BLOK DIAGRAM

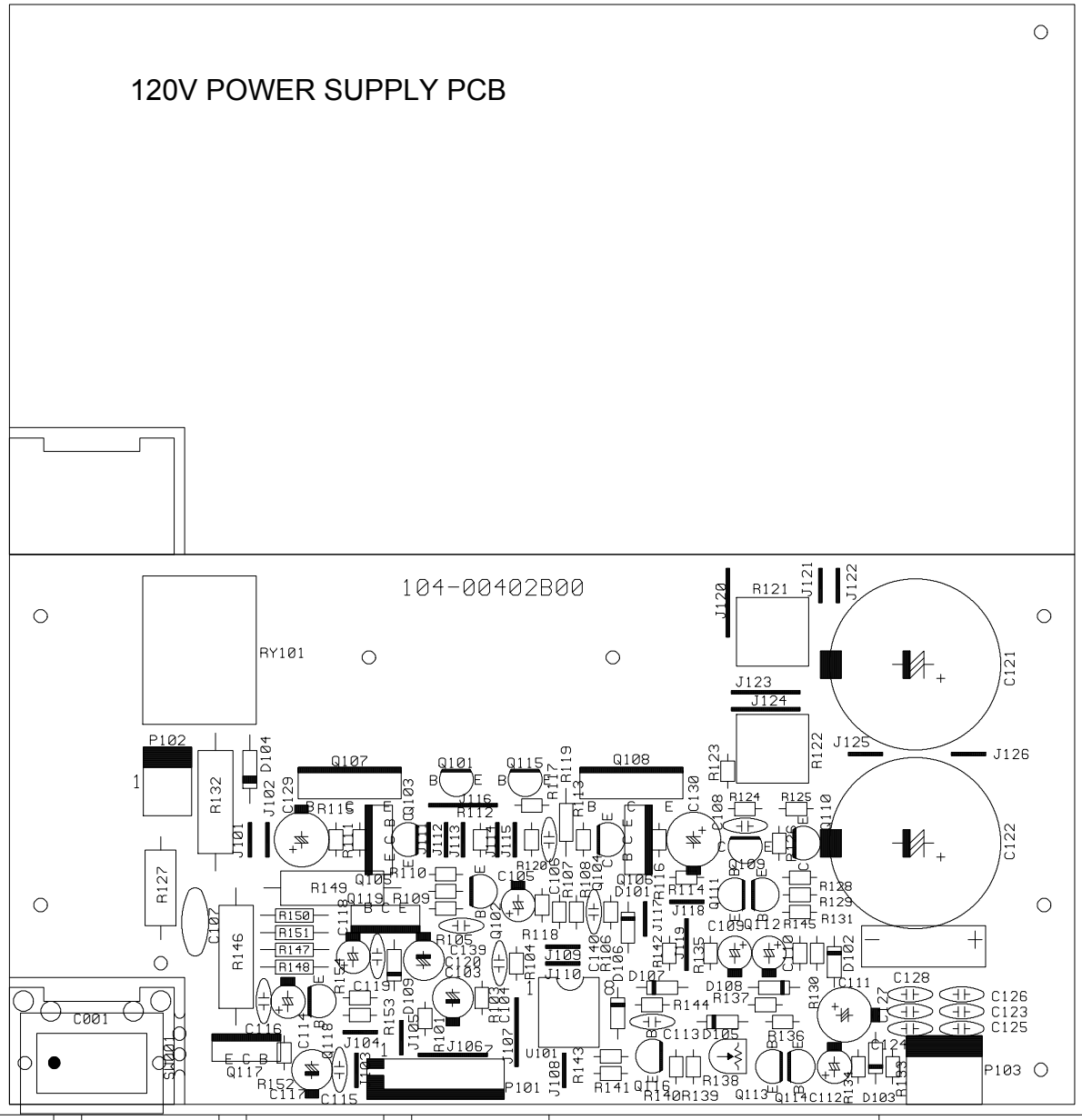


	DRAW.		DSGN.		APVD.		
FILENAME :SUB200PR.PCB						REVISION:	
MODEL NO.104-A00418A00						1	
MATERIAL :94V0 1.6T(FR-1)						2	
LAYER SILK SCREEN						3	



	DRAW.		DSGN.		APVD.		FILENAME :SUB200PR.PCB	REVISION:
							MODEL NO.104-A00418A00	1
							MATERIAL :94V0 1.6T(FR-1)	2
							LAYER SOLDER PATTERN	3

120V POWER SUPPLY PCB



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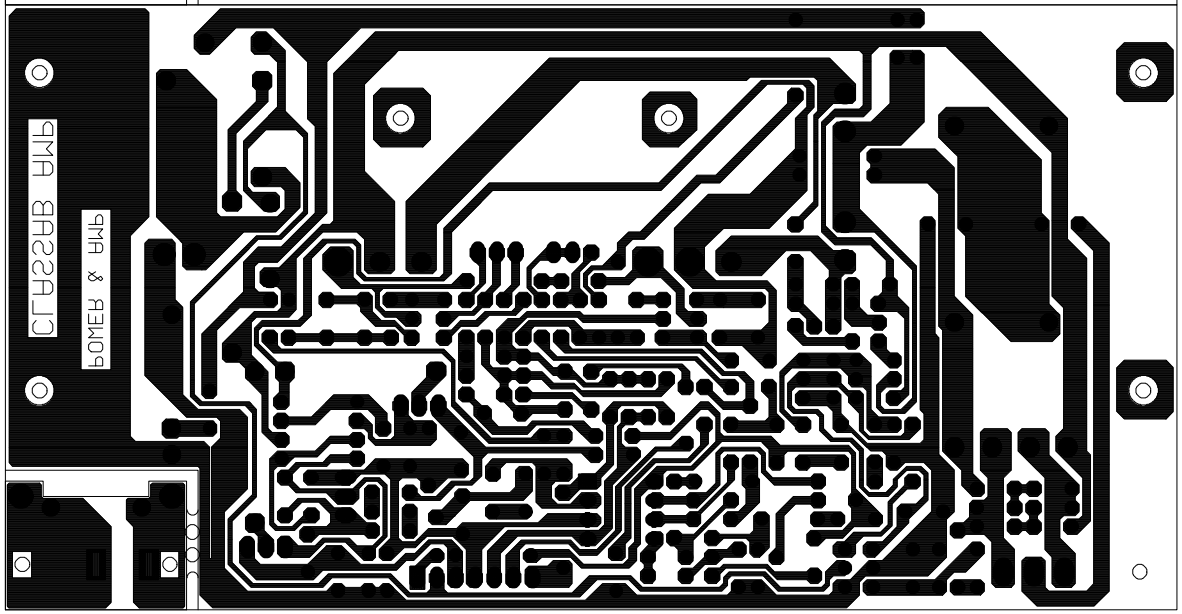
			MATERIAL : FR-1(94V0)	2	
			LAYER SILK SCREEN	3	

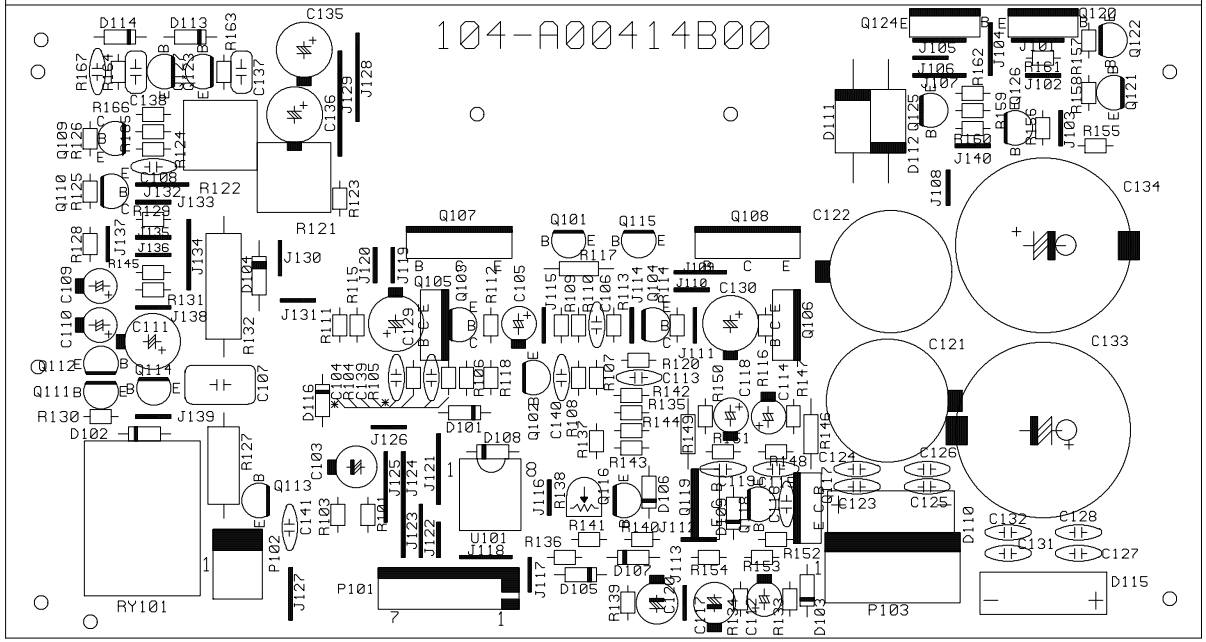
120V POWER SUPPLY PCB



	DRAW.		DSGN.		APVD.		

FILENAME : HKTS7U.PCB	REVISION:
MODEL NO. 104-00402B00	1
MATERIAL : FR-1(94V0)	2
LAYER SOLDER PATTERN	3

230V POWER SUPPLY PCB



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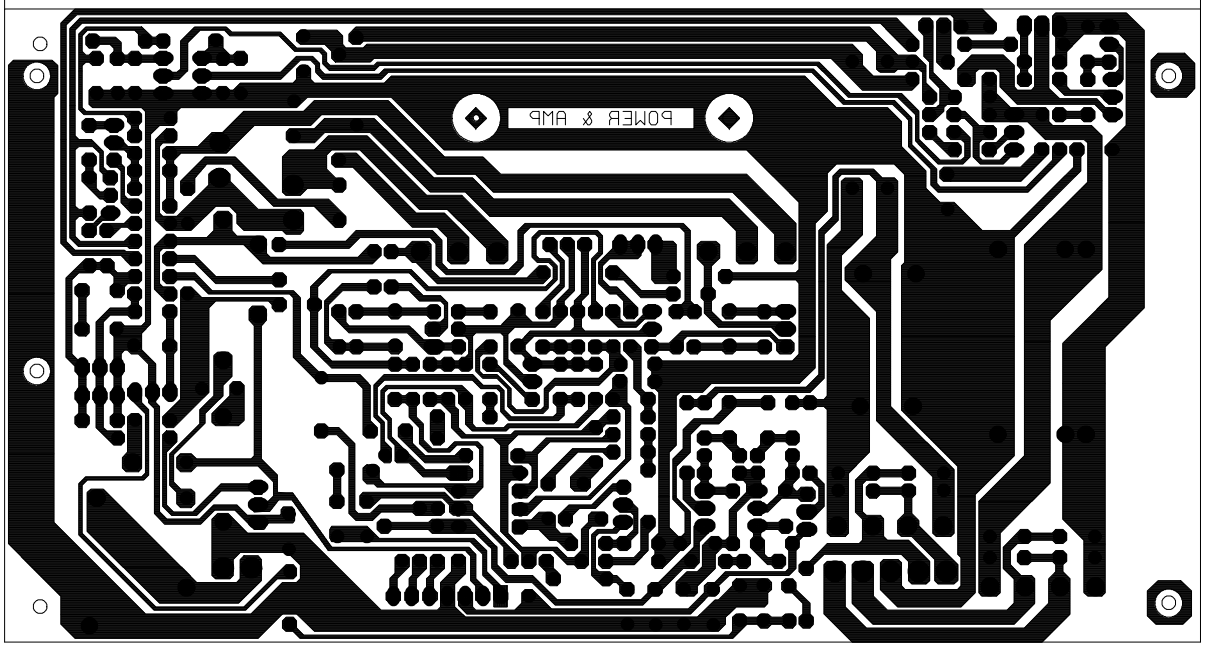
							LAYER SILK SCREEN	3

230V POWER SUPPLY PCB



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							MODEL NO. 104-A00414B00	1
							MATERIAL : 94V0(FR-1)	2
							LAYER SOLDER PATTERN	3

SUB200 120v Electrical parts List			
Part Number	Description	Qty	Reference Designator
Main Amp PCB			
Resistors			
110-14472j26	Resistor 4.7K 1/4W ±5% 26mm	2	R147,150
110-14681j26	Resistor 680Ω 1/4W ±5% 26mm	2	R148,151
110-16101j26	Resistor10 0Ω 1/6W ±5%CF 26mm	1	R120
110-16102j26	Resistor 1K 1/6W ±5% CF 26mm	1	R124
110-16103j26	Resistor 10K 1/6W ±5% CF 26mm	1	R134
110-16105j26	Resistor 1M 1/6W ±5% CF 26mm	1	R143
110-16123j26	Resistor 12K 1/6W ±5% CF 26mm	2	R135,139
110-16152j26	Resistor 1.5K 1/6W ±5% CF 26mm CF	6	R103,123,136,137,141,142
110-16153j26	Resistor 15K 1/6W ±5% CF 26mm	4	R118,145,152,154
110-16154j26	Resistor 150K 1/6W ±5% CF 26mm	1	R131
110-16181j26	Resistor 18Ω 1/6W ±5% CF 26mm	2	R11,114
110-16182j26	Resistor 1.8K 1/6W ±5% CF 26mm	1	R153
110-16223j26	Resistor 22K 1/6W ±5% CF 26mm	3	R128,129,133
110-16332j26	Resistor 3.3K 1/6W ±5% CF 26mm	3	R106,107,144
110-16392j26	Resistor 3.9K 1/6W ±5% CF 26mm	2	R105,108
110-16393j26	Resistor 39K 1/6W ±5% CF 26mm	1	R126
110-16470j26	Resistor 47Ω 1/6W ±5%CF 26mm	4	R112,113,115,116
110-16471j26	Resistor 470Ω 1/6W ±5% CF 26mm	1	R140
110-16472j26	Resistor 4.7K 1/6W ±5% CF 26mm	3	R110,125,130
110-16473j26	Resistor 47K 1/6W ±5% CF 26mm	1	R101
110-16560j26	Resistor 56Ω 1/6W ±5% CF 26mm	1	R117
110-16563j26	Resistor 56K 1/6W ±5% CF 26mm	1	R104
110-16682j26	Resistor 6.8K 1/6W ±5% CF 26mm	1	R109
110-10821jk2	Resistor 820Ω 1W ±5% 10mm	1	R132
110-122r2j15	Resistor 2.2Ω 1/2W ±5% 15mm	1	R127
110-20331jk2	Resistor 330Ω 2W ±5% 5mm	2	R146,149
113-50r10j10	cement Resistor 0.1Ω 5W ±5%	2	R121,122
114-03302m0	semi-fixed Resistor 3K 0.3W 1±20%	1	R138
Capacitors			
132-223ja03	mylar capacitor 0.022uF 100V ±5%	2	C123,127
135-3107m16	electrolytic 100uF 16V ±20%	1	C110
135-4688m50	electrolytic 6800U/50V ±20% D25X45mm	2	C121,122
130-2b102k503	disc capacitor 1000p 50V±10%	1	C116
130-2f104z503	disc capacitor0.1u 50V+80/ -20%	4	C108.113.115.119
130-3f473m503	disc capacitor0.047u 50V±20%	1	C106
130-s1101k503	disc capacitor100p 50V SL±10%	2	C139,140
132-104J503	mylar capacitor 0.1u50V ±5%	1	C107
132-223ja03	mylar capacitor 0.022uF 100V ±5%	4	C124,125,126,128
135-3105m50	mylar capacitor 1U 50V ±20%	2	C105,112
135-3107m16	mylar capacitor 100uF 16V ±20%	3	C109,117,120
135-3226m50	mylar capacitor 22U 50V ±20%	2	C114,118
135-3227m10	mylar capacitor 220U 10V ±20%	2	C129,130
135-3227m16	mylar capacitor 220U 16V ±20%	1	C111
135-3476m25	mylar capacitor 47U 25V ±20%	1	C103
Semiconductors			
192-027c1815gr	transistor 2SC1815GR NPN	5	Q102,111,112,113,118
192-028a1015gr	transistor 2SA1015GR PNP	2	Q114,116
192-1572n5551	transistor 2N5551 NPN	2	Q103,109
192-1582n5401	transistor 2N5401 AI-PNP 350V 500MA TO-92	2	Q104,110
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM	4	D101,103,105,108
199-15000335	zener diode3.3V 1/2W 52mm	1	D102
199-15000625	zener diode 6.2V 1/2W 52mm	2	D106,107
199-15001605	zener diode 16V 1/2W 52mm	1	D109
190-06m4558d	IC OPA 4558D DUAL OP-AMP	1	U101

Part Number	Description	Qty	Reference Designator
Main Amp PCB			
192-021tip35c	transistor TIP35C NPN	1	Q107
192-022tip36c	transistor TIP36C PNP	1	Q108
192-027c1815gr	transistor 2SC1815GR NPN	2	Q101,115
192-201d882Y	transistor KSD882Y PNP	1	Q117
192-202b772y	transistor KSB772Y PNP	1	Q119
192-991d669a	transistor HI-SINCERITY HSD669A NPN	1	Q106
192-992b649T	transistor HSB649T PNP	1	Q105
197-00kb1405	diode 4A500V KBL405 BRIDGE	1	D110
197-101n4002	diode IN4002	1	D104
Miscellaneous			
193-3m2520	insulator TO-3P 25x20mm	2	for Q107,108
162-10202001	wire 26AWC 1007 200mm RED	1	
171-udhss124d	relay 5A 24V UDH-SS124D	1	RY101
175-1c07v01	wire connector 7PIN PITCH=2.5mm	1	P101
175-1d02v01	wire connector 2PIN PITCH=3.96mm	1	P102
175-1d03v01	wire connector 3PIN PITCH=3.96mm	1	P103
323-AL-00020	Heat sink 65*32*31	1	
351-AM03014A094	screw	1	
352-AM03008D040	screw	4	
361-FE-00051	transistor holder	1	
361-NYL-00054	transistor sheet	2	
Input/Preamp PCB			
Resistors			
110-12472j52	Resistor 4.7K 1/2W ±5% CF 52mm	2	R201,202
110-16102j26	Resistor 1K 1/6W ±5% CF 26mm	4	R213,214,215,254
110-16103j26	Resistor 10K 1/6W ±5% CF 26mm	14	R209,212,216,217,220,221,222,225,228,226,232,235,240,248
110-16104j26	Resistor 100K 1/6W ±5% CF 26mm	2	R231,266
110-16105j26	Resistor 1M 1/6W ±5% CF 26mm	1	R259
110-16122j26	Resistor 1.2K 1/6W ±5% CF 26mm	1	R264
110-16124j26	Resistor 120K 1/6W ±5% CF 26mm	1	R233
110-16151j26	Resistor 150Ω 1/6W ±5% CF 26mm	1	R253
110-16153j26	Resistor 15K 1/6W ±5% CF 26mm	1	R234
110-16154j26	Resistor 150K 1/6W ±5% CF 26mm	5	R203,204,205,206,252
110-16183j26	Resistor 18K 1/6W ±5% CF 26mm	2	R262,227
110-16205j26	Resistor 2M 1/6W ±5% CF 26mm	1	R257
110-16223j26	Resistor 22K 1/6W ±5% CF 26mm	4	R238,247,250,255
110-16273j26	Resistor 27K 1/6W ±5% CF 26mm	2	R223,237
110-16333j26	Resistor 33K 1/6W ±5% CF 26mm	1	R249
110-16472j26	Resistor 4.7K 1/6W ±5% CF 26mm	4	R200,207,258,260
110-16473j26	Resistor 47K 1/6W ±5% CF 26mm	2	R219,251
110-16512j26	Resistor 5.1K 1/6W ±5% CF 26mm	4	R210,211,229,230
110-16513j26	Resistor 51K 1/6W ±5% CF 26mm	1	R224
115-h503a104	Variable resistor D16 50K/1 A LEVEL	1	VR201
Capacitors			
130-2b221k503	disc capacitor 220P 50V ± 10%	12	C204,205,207,208,210,211,212,214,220,230,200,249
130-2f104z503	disc capacitor 0.1U 50V +80/-20%	7	C232,242,244,245,246,252,254
130-sl470k503	disc capacitor 47P 50V ± 10%	1	C229
132-103j503	electolytic 0.01U 50V ± 5%	2	C223,224
132-104j503	electolytic 0.1U 50V ± 5%	3	C218,221,222
132-223ja03	electolytic 0.22uF 100V ± 5%		C215
132-473j503	electolytic 0.047U 50V ± 5%	2	C216,217
135-3105m50	electolytic 1U 50V ± 20%	1	C228
135-3106m50	electolytic 10uF 50V ± 20%	10	C201,202,206,213,219,231,241,243,251,253
135-3107m16	electolytic 100uF 16V ± 20%	2	C233,234

Part Number	Description	Qty	Reference Designator
Input/Preamp PCB			
135-3226m50	electolytic 22U 50V ± 20%	1	C225
Semiconductors			
192-027c1815gr	transistor 2SC1815GR NPN	3	Q201,206,207
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM	11	D201,202,203,204,205,206,207,208,211,212,214
199-15000335	zener diode 3.3V 1/2W 52mm	1	D213
190-06m4558d	I.C OPA 4558D DUAL OP-AMP	1	U203
190-16t1074cn	I .C TL074cm QUAD OP-AMP	2	U201,202
195-10204hgw	LED 204HGW 3c	1	D209
Miscellaneous			
162-50159201	WIRE ASS'Y 2PIN 150mm	1	for D209
174-0rca326p	JACK RCA-326 3 input	1	JK202
174-2psz406g1	JACK S-8071	1	JK203
174-2psz406g2	SPK JK 4PIN S-8072	1	JK203
Limiter PCB			
110-16103j26	Resistor 10K 1/6W ±5% CF 26mm	8	R301,303,304,308,309,314,340,344
110-16183j26	Resistor 18K 1/6W ±5% CF 26mm	1	R302
110-16223j26	Resistor 22K 1/6W ±5% CF 26mm	2	R310,312
110-16273j26	Resistor 27K 1/6W ±5% CF 26mm	1	R341
110-16333j26	Resistor 33K 1/6W ±5% CF 26mm	1	R305
110-16472j26	Resistor 4.7K 1/6W ±5% CF 26mm	2	R342,343
110-16474j26	Resistor 470K 1/6W ±5% CF 26mm	1	R307
110-16751j26	Resistor 750Ω 1/6W ±5% CF 26mm	2	R311,313
110-16755j26	Resistor 7.5M 1/6W ±5% CF 26mm	1	R306
130-2f104z503	disc capacitor 0.1u 50V +80/-20%	2	C305,306
132-103j503	mylar capacitor 0.01U 50V ± 5%	2	C302,303
135-3226m50	electolytic 22U 50V ± 20%	2	C301,340
135-3476m25	electolytic 47U 25V ± 20%	1	C304
192-027c1815gr	transistor 2SC1815GR NPN	2	Q301,302
197-031n4148	diode 100mA 75V SIGNAL 1N4148	2	D301,302
162-50289001	wire CABLE ASS'Y280mm AWG26	1	
175-9F40HR2	wire connector 40PIN PITCH=2.54mm HR2*40	0.15	P301
190-16tl074cn	IC TL074CN ST	1	U301
MISCELLANEOUS			
130-3f472md00	disc capacitor 4700p 400V ± 20%	1	On Power Switch
123-14j70d	Ferrite Core U-16.3*8.2*13	1	
150-e8604107	Power Trans EI-86 60HZ 120V TT086996580	1	T1
152-u602015	LineCord SVT FT-2 6FT	1	
154-u25006t0	Fuse 2.5A 250V 20mm	1	
155-520020	Fuse Holder R3-11	1	
162-10082007	WIRE RED 18AWG 80mm 8mm#1015	1	
162-50652003	WIRE 650mm RED=205# 0.5T BLK=110# 0.5T	1	
163-11009	wire tie 100mm	2	
176-wjcel	wire connector Pin CE-1	1	
180-prf1003S	switch ROCK RF-1003-BB2-OHA	1	SW100
302-AL-00406-0VC	Alu. Panel	1	
306-ABS-00177	Rear cover	1	
311-ABS-00028	Plastic knob	1	
302-RUB-00033	Rubber cusion	4	
323-AL-00141	Heat sink	1	
333-EVA-00783	EVA (Gasket)	2	
333-EVA-00807	EVA (Gasket)	2	
333-EVA-00826	EVA (Gasket)	2	
333-EVA-00835	EVA (Gasket)	2	
335-NYL-00002	Cable ring	2	

Part Number	Description	Qty	Reference Designator
MISCELLANEOUS			
337-CU-00101	Rubber sheet	1	
350-EM04012D024	Screw	4	
351-AM03008A079	Screw	6	
351-BM03012A088	Screw	1	
351-HM04016A218	Screw	4	
352-AM03008D040	Screw	8	
352-AM03010D065	Screw	5	
354-GM04002	Screw nut	4	
361-FE-00051	IC holder	1	
362-FE-00013	PCB holder	2	

SUB200 230v Electrical parts List

Part Number	Description	Qty	Reference Designator
Input/Preamp PCBs			
Resistors			
110-12472j52	Resistor 4.7K 1/2W ±5% CF 52mm	2	R20,202
110-16102j26	Resistor 1K 1/6W ±5% CF 26mm	4	R213,214,215,254
110-16103j26	Resistor 10K 1/6W ±5% CF 26mm	14	R209,212,216,217,220,221,222,225,228,226,232,235, 240,248
110-16104j26	Resistor 100K 1/6W ±5% CF 26mm	2	R231,266
110-16105j26	Resistor 1M 1/6W ±5% CF 26mm	1	R259
110-16122j26	Resistor 1.2K 1/6W ±5% CF 26mm	1	R264
110-16124j26	Resistor 120K 1/6W ±5% CF 26mm	1	R233
110-16151j26	Resistor 150Ω 1/6W ±5% CF 26mm	1	R253
110-16153j26	Resistor 15K 1/6W ±5% CF 26mm	1	R234
110-16154j26	Resistor 150K 1/6W ±5% CF 26mm	5	R203,204,205,206,252
110-16183j26	Resistor 18K 1/6W ±5% CF 26mm	2	R262,227
110-16205j26	Resistor 2M 1/6W ±5% CF 26mm	1	R257
110-16223j26	Resistor 22K 1/6W ±5% CF 26mm	4	R238,247,250,255
110-16273j26	Resistor 27K 1/6W ±5% CF 26mm	2	R223,237
110-16333j26	Resistor 33K 1/6W ±5% CF 26mm	1	R249
110-16472j26	Resistor 4.7K 1/6W ±5% CF 26mm	4	R200,207,258,260
110-16473j26	Resistor 47K 1/6W ±5% CF 26mm	2	R219,251
110-16512j26	Resistor 5.1K 1/6W ±5% CF 26mm	4	R210,211,229,230
110-16513j26	Resistor 51K 1/6W ±5% CF 26mm	1	R224
115-h503a104	variable resistor D16 50K/1 A	1	VR201
Capacitors			
130-2b221k503	disc capacitor 220P 50V ± 10%	12	C204,205,207,208,210,211,212,214,220,230,200,249
130-2f104z503	disc capacitor 0.1U 50V +80/-20%	7	C232,242,244,245,246,252,254
130-sl470k503	disc capacitor 47P 50V ± 10%	1	C229
132-103j503	Electrolytic 0.01U 50V ± 5%	2	C223,224
132-104j503	Electrolytic 0.1U 50V ± 5%	3	C218,221,222
132-223ja03	Electrolytic 0.02uF100V ± 5%	1	C215
132-473j503	Electrolytic 0.047uF 50V ± 5%	2	C216,217
135-3105m50	Electrolytic 1U 50V ± 20%	1	C228
135-3106m50	Electrolytic 10uF 50V ± 20%	10	C201,202,206,213,219,231,241,243,251,253
135-3107m16	Electrolytic 100uF 16V ± 20%	2	C233,234
135-3226m50	Electrolytic 22U 50V ± 20%	1	C225
Semiconductors			
192-027c1815gr	transistor 2SC1815GR NPN	3	Q201,206,207
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM	11	D201,202,203,204,205,206,207,208,211,212,214
199-15000335	zener diode 3.3V 1/2W 52mm	1	D213
190-06m4558d	I.C OPA 4558D DUAL OP-AMP	1	U203
190-16t1074cn	I .C TL074cm QUAD OP-AMP	2	U201,202
195-10204hgw	LED 204HGW 3c	1	D209
Miscellaneous			
162-50159201	WIRE ASS'Y 2PIN 150mm	1	D209
174-0rca326p	JACK RCA-326	1	JK202
174-2psz406g1	JACK S-8071	1	JK203
174-2psz406g2	SPK JK 4PIN S-8072	1	JK203
Main Amp PCB			
Resistors			
110-14560j26	Resistor 56Ω 1/4W ±5% CF 26mm	1	R117

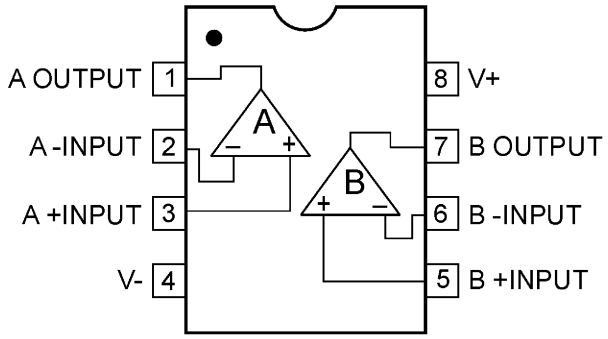
Part Number	Description	Qty	Reference Designator
Main Amp PCB			
110-14680j26	Resistor 68Ω 1/4W ±5% CF 26mm	2	R146,149
110-16101j26	Resistor 100Ω 1/6W ±5% CF 26mm	1	R120
110-16102j26	Resistor 1K 1/6W ±5% CF 26mm	2	R124,166
110-16103j26	Resistor 10K 1/6W ±5% CF 26mm	1	R133
110-16104j26	Resistor 100K 1/6W ±5% CF 26mm	2	R163,164
110-16105j26	Resistor 1M 1/6W ±5% CF 26mm	1	R143
110-16123j26	Resistor 12K 1/6W ±5% CF 26mm	4	R135,139,165,134
110-16152j26	Resistor 1.5K 1/6W ±5% CF 26mm	7	R103,123,136,137,141,142,153
110-16153j26	Resistor 15K 1/6W ±5% CF 26mm	4	R118,145,152,154
110-16154j26	Resistor 150K 1/6W ±5% CF 26mm	1	R131
110-16181j26	Resistor 180Ω 1/6W ±5% CF 26mm	2	R111,114
110-16223j26	Resistor 22K 1/6W ±5% CF 26mm	6	R128,129,155,156,158,160
110-16332j26	Resistor 3.3K 1/6W ±5% CF 26mm	3	R106,107,144
110-16392j26	Resistor 3.9K 1/6W ±5% CF 26mm	2	R105,108
110-16393j26	Resistor 39K 1/6W ±5% CF 26mm	1	R126
110-16470j26	Resistor 47Ω 1/6W ±5% CF 26mm	4	R112,113,115,116
110-16471j26	Resistor 470Ω 1/6W ±5% CF 26mm	3	R140,161,162
110-16472j26	Resistor 4.7K 1/6W ±5% CF 26mm	4	R200,207,258,260
110-16473j26	Resistor 47K 1/6W ±5% CF 26mm	1	R101
110-16563j26	Resistor 56K 1/6W ±5% CF 26mm	1	R104
110-16681j26	Resistor 680Ω 1/6W ±5% CF 26mm	2	R148,151
110-16682j26	Resistor 6.8K 1/6W ±5% CF 26mm	1	R109
110-10821jk2	resistor 820Ω 1W ±5% 10mm	1	R132
110-122r2j15	resistor 2.2Ω 1/2W ±5% 15mm	1	R127
110-20331jk2	resistor 330Ω 2W ±5% 5mm	2	R146,149
113-50r10j10	cement resistor 0.1Ω 5W ±5%	2	R121,122
114-03302m0	semi-fixed resistor 3K 0.3 ±20%	1	R138
Capacitors			
135-4478m35	electrolytic 4700uf 35v ±20%	1	121,122
135-4478m50	electrolytic 4700uf 50v ±20%	2	C133,134
130-2b102k503	disc capacitor 1000P 50V ± 10%	2	C116,141
130-2f104z503	disc capacitor 0.1U 50V +80/-20%	6	C108,113,115,119,137,138
130-3f473m503	disc capacitor 0.047U 50V ± 20%	1	C106
130-sl101k503	disc capacitor 100P 50V SL ± 10%	3	C139,140,104
132-104j503	Electrolytic 0.1U 50V ± 5%	1	C107
132-223ja03	Electrolytic 0.022uF 50V ± 5%	8	C124,125,126,128,123,127,131,132
135-3105m50	Electrolytic 1U 50V ± 20%	2	C105,112
135-3107m16	Electrolytic 100uF 16V ± 20%	4	C109,117,120,110
135-3226m50	Electrolytic 22U 50V ± 20%	2	C114,118
135-3227m10	Electrolytic 220U 10V ± 20%	2	C129,130
135-3227m16	Electrolytic 220U 16V ± 20%	1	C111
135-3476m25	Electrolytic 47U 25V ± 20%	1	C103
135-3107-m50	Capacitor 100U 50V	2	C135, 136
Semiconductors			
192-027c1815gr	Transistor 2SC1815GR NPN	7	Q101,102,111,112,113,115,118,123,126
192-027c2235y	Transistor 2SC2235Y NPN	1	Q121
192-028a1015gr	Transistor 2SA1015GR PNP	4	Q114,116,122,127
192-028a965y	Transistor 2SA965Y PNP	1	Q125
192-1572n5551	Transistor 2N5551 NPN	2	Q103,109
192-1582n5401	92	2	Q104,110
192-992b649T	Transistor HSB649T PNP	1	Q105
192-021tip35c	Transistor TIP35C NPN	1	Q107
192-022tip36c	Transistor TIP36C PNP	1	Q108
192-161tip41c	Transistor TIP41C NPN SGS	1	Q124
192-162tip42c	Transistor TIP42C NPN SGS	1	Q120
192-201b882Y	transistor KSD882Y NPN	1	Q117
192-201b772Y	transistor KSB772Y PNP	1	Q119
192-991d669a	Transistor HI-SINCERITY HSD669A NPN	1	Q106

Part Number	Description	Qty	Reference Designator
Main Amp PCB			
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM	7	D101,103,105,108,113,114,116
199-15000335	zener diode 3.3V 1/2W 52mm	1	D102
199-15000625	zener diode 6.2V 1/2W 52mm	2	D106,107
199-15001605	zener diode 16V 1/2W 52mm	1	D109
197-00kb1405	diode 4A500V KBL405 BRIDGE	2	D110,115
197-101n4002	diode IN4002	1	D104
197-101n5402	diode IN5402	2	D111,112
190-06m4558d	IC OPA 4558D Dual Op-Amp	1	U101
Miscellaneous			
323-AL-00020	HEAT SINK 65*32*31	1	
351-AM03014A094	Screw M3*14	1	
352-AM03008D040	Screw ¢3*8	4	
361-FE-00051	diode holder 14.2*8.0*5.2t=1.6mm	1	
361-NYL-00054	Insulated sheet	2	
193-3m2520	insulator TO-3P 25x20mm	2	for Q107,108
171-udhss124d	relay 5A 24V UDH-SS124D	1	RY101
162-10202001	wire 26AWC 1007 200mm RED 3m	1	
175-1c07v01	wire connector 7PIN PITCH=2.5mm	1	P101
175-1d02v01	wire connector 2PIN PITCH=3.96mm	1	P102
175-1d05v01	wire connector 5PIN PITCH=3.96mm	1	P103
Limiter PCB			
110-16103j26	Resistor 10K 1/6W ±5% CF 26mm	8	R301,303,304,308,309,314,340,344,
110-16183j26	Resistor 18K 1/6W ±5% CF 26mm	1	R302
110-16223j26	Resistor 22K 1/6W ±5% CF 26mm	2	R310,312
110-16273j26	Resistor 27K 1/6W ±5% CF 26mm	1	R341
110-16333j26	Resistor 33K 1/6W ±5% CF 26mm	1	R305
110-16472j26	Resistor 4.7K 1/6W ±5% CF 26mm	2	R342,343
110-16474j26	Resistor 470K 1/6W ±5% CF 26mm	1	R307
110-16751j26	Resistor 750Ω 1/6W ±5% CF 26mm	2	R311,313
110-16755j26	Resistor 7.5k 1/6W ±5% CF 26mm	1	R306
130-2f104z503	disc capacitor 0.1u 50V +80/-20%	2	C305,306
132-103j503	mylar capacitor 0.01U 50V ± 5%	2	C302,303
135-3226m50	Electrolytic 22U 50V ± 20%	2	C301,340
135-3476m25	Electrolytic 47U 25V ± 20%	1	C304
192-027c1815gr	SMD Transistor 2SC1815TRP	2	Q301,302
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM	2	D301,302
162-50289001	wire CABLE ASS'Y280mm AWG26	1	
175-9f40hr2	wire connector 40P PITCH=2.54mm HR2*40	0.15	P301
190-16tl074cn	IC TL047CN ST	1	U301
MISCELLANEOUS			
123-14j70d	Ferrite Core U-16.3*8.2*13	1	
132-104kb70	mylar capacitor 0.1uF 275V ±10% VDE	1	POWER SW
150-e8604106	Power Transformer EI-86 230V/50HZ TT0869803320	1	
152-v602026	Power cord SP-021A 6FT VDE	1	
154-v12506t0	Fuse TSD 1.25A 250V VDE	1	FS101
155-520020	Fuse Holder R3-11	1	
162-10082007	WIRE RED 18AWG 80mm 8mm#1015	1	
162-50652003	WIRE 650mm RED=205# 0.5T	1	
176-wjcel	wire connector Pin CE-1	1	
180-prf1003s	switch ROCK RF-1003-BB2-OHA	1	SW101
193-2m1813	insulator TO-220 18*13mm	2	Q120,124
350-EM04012D024	Screw 4¢*12	4	
351-HM04016A218	Screw M4*16	4	
351-BM03012A088	Screw M3*12	1	
351-AM03008A079	Screw M3*8	6	

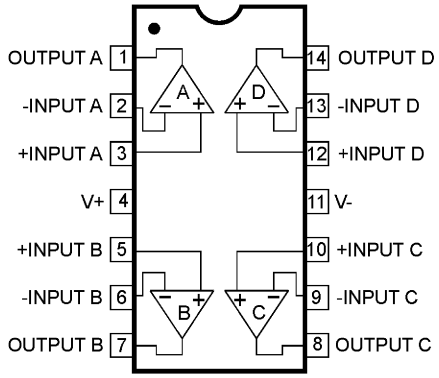
Part Number	Description	Qty	Reference Designator
MISCELLANEOUS			
352-AM03010D065	Screw ℄3*10	5	
352-AM03008D040	Screw ℄3*8	8	
354-GM04002	Screw M4	4	
361-FE-00004	IC HOLDER 26.9*12*1.4T	1	
362-FE-00013	PCB holder	2	
311-ABS-00028	Plastic volume knob	1	
335-NYL-00002	Wire knob	2	
333-EVA-00783	EVA W 198*12*2.0T	2	
333-EVA-00807	EVA L 274*12*2.0T	2	
333-EVA-00826	EVA W 198*12*1.0T	2	
333-EVA-00835	EVA L 274*12*1.0T	2	
320-RUB-00033	Rubber sheet 25*21*4t	4	
337-CU-00101	Copper sheet 65L*50W	1	
323-AL-00141	HEAT SINK 117.5*71.5*25	1	
302-AL-00405-0VC	Aluminum panel 200*300*2.5T	1	
306-ABS-00206	Rear Plastic cover 198*298*102H	1	

Integrated Circuit Diagrams

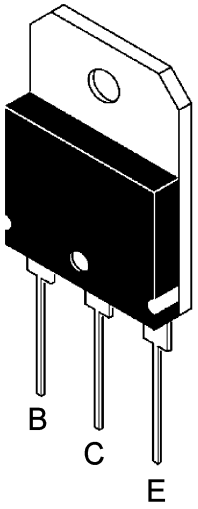
4558 Dual Op Amp
U101,203



OPAMP, QUAD 14P DIL TL074
U201, 202, 301



TIP35C, TIP36C
Q107,108



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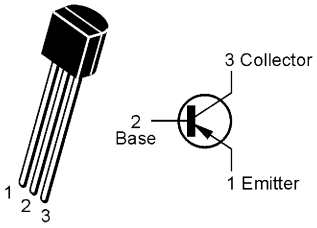
Q104, 110



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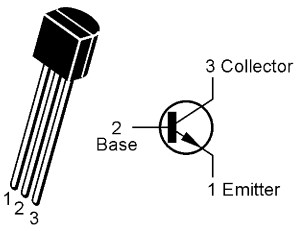
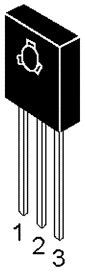
Q103, 109

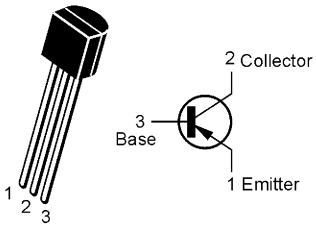


2SD669A, 2SB649A
KSB772 , KSD882
Q105, 106 ,117,119

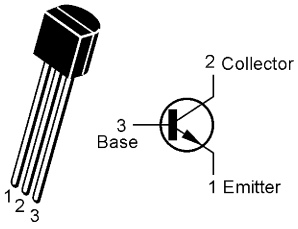


1. Emitter
2. Collector
3. Base

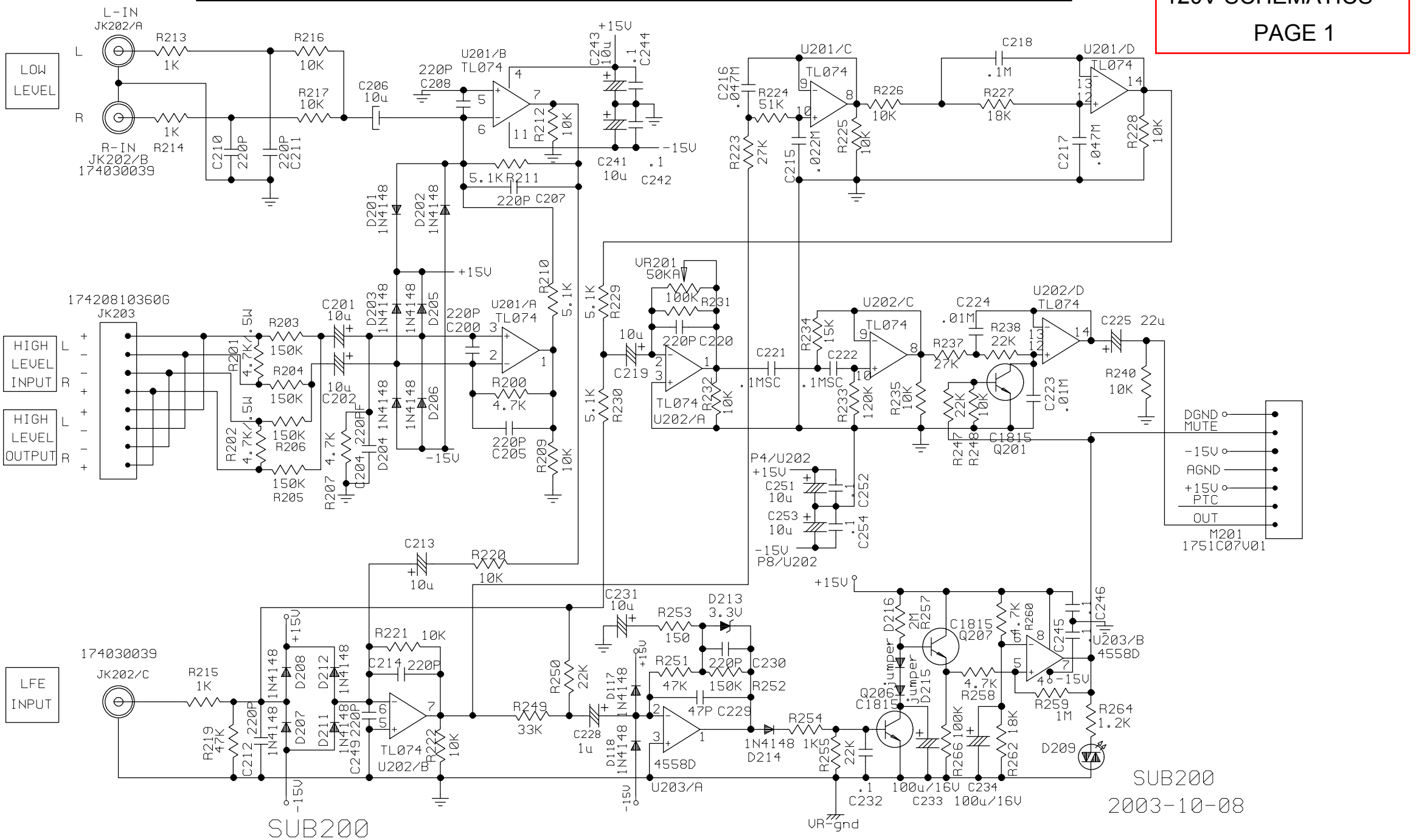
2SA1015
Q114,116

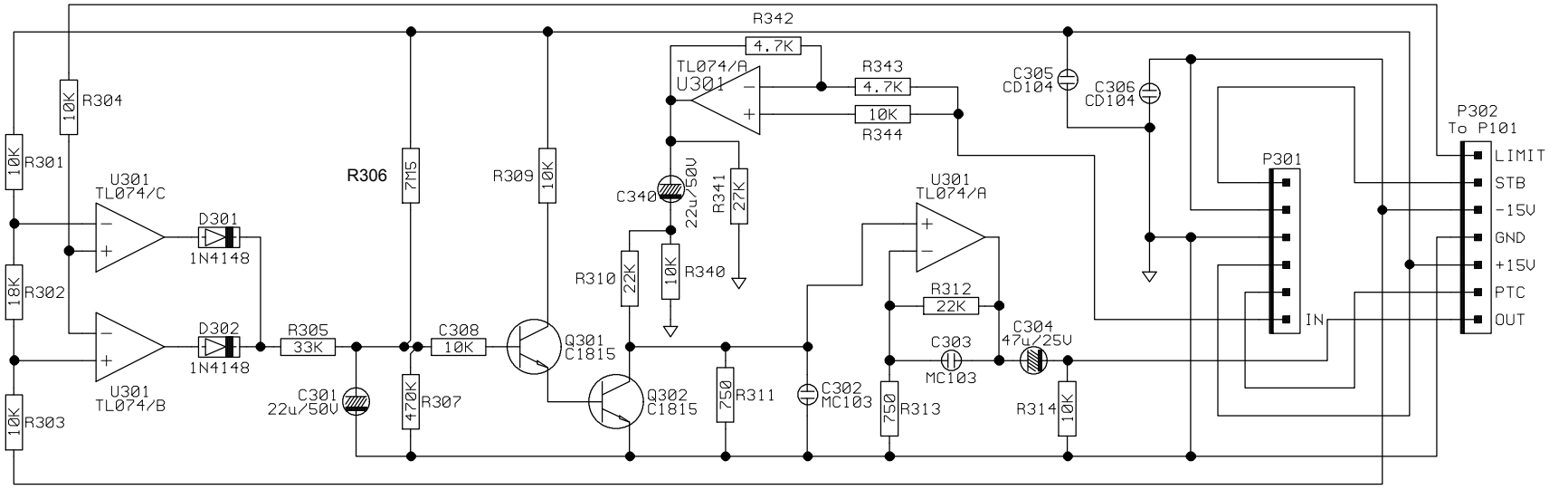


2SC1815
Q101,102,111,112,113,115,118,
201,206,207,301,302.



120V SCHEMATICS
PAGE 1



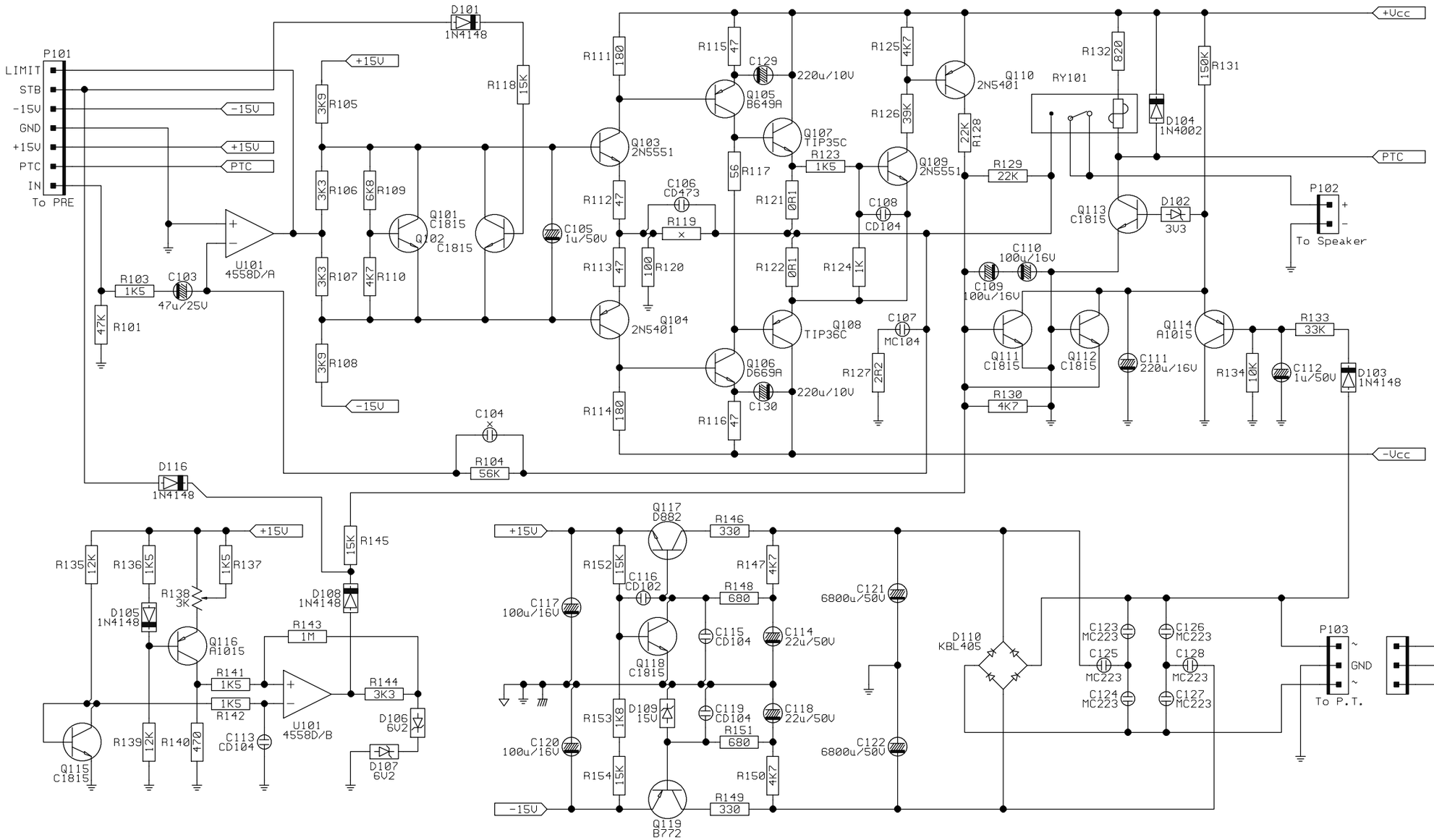


120V SCHEMATICS
PAGE 2

STANDBY DELAY
Adjustment Procedure for R138:

Use DC voltmeter attached to R140,
adjust R138 until the meter reads
510mV (+/-2mV) (for 120v model)
460mV (+/-2mV) (for 230v model)

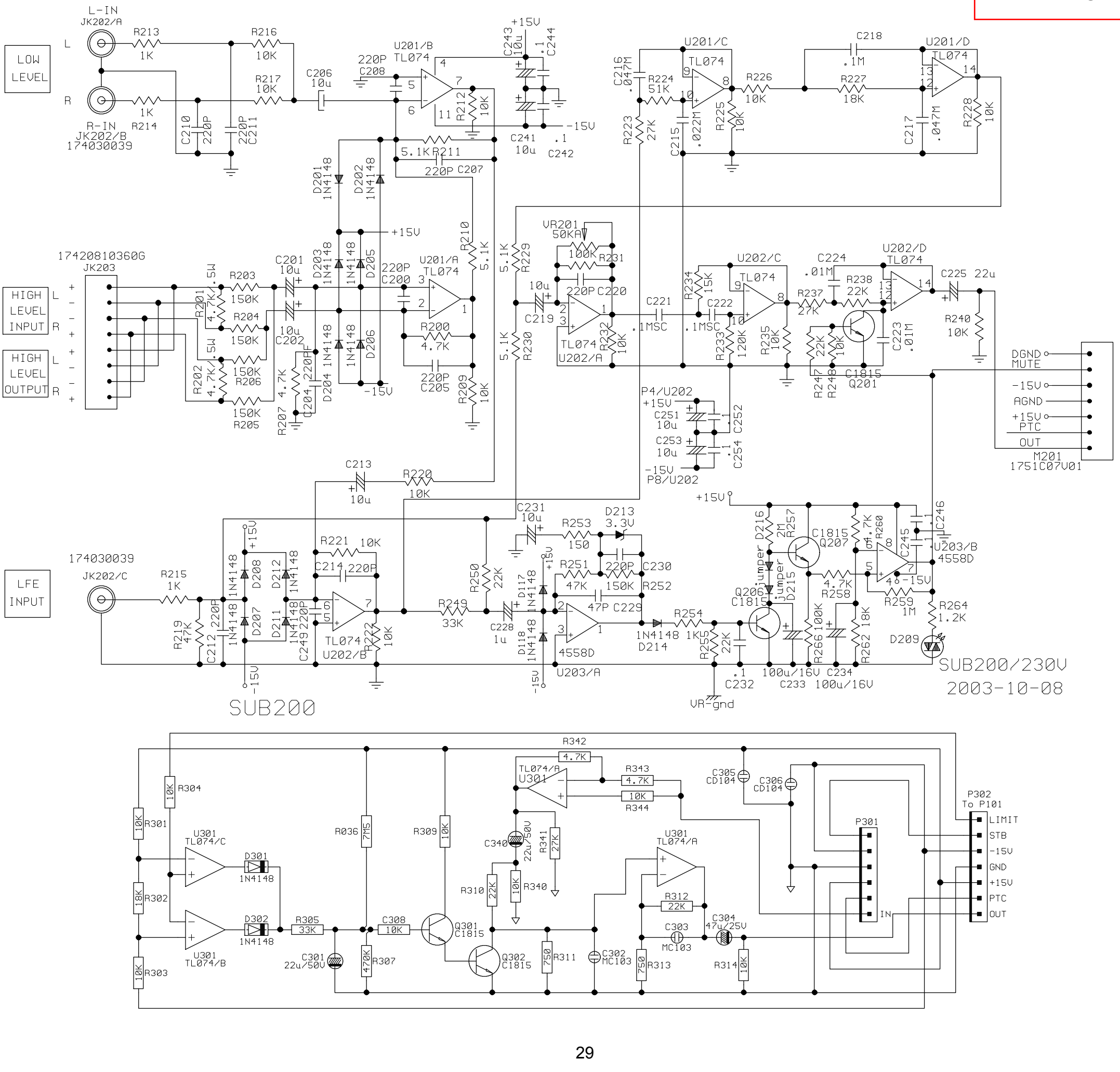
then use "LOCTITE" to fix R138.



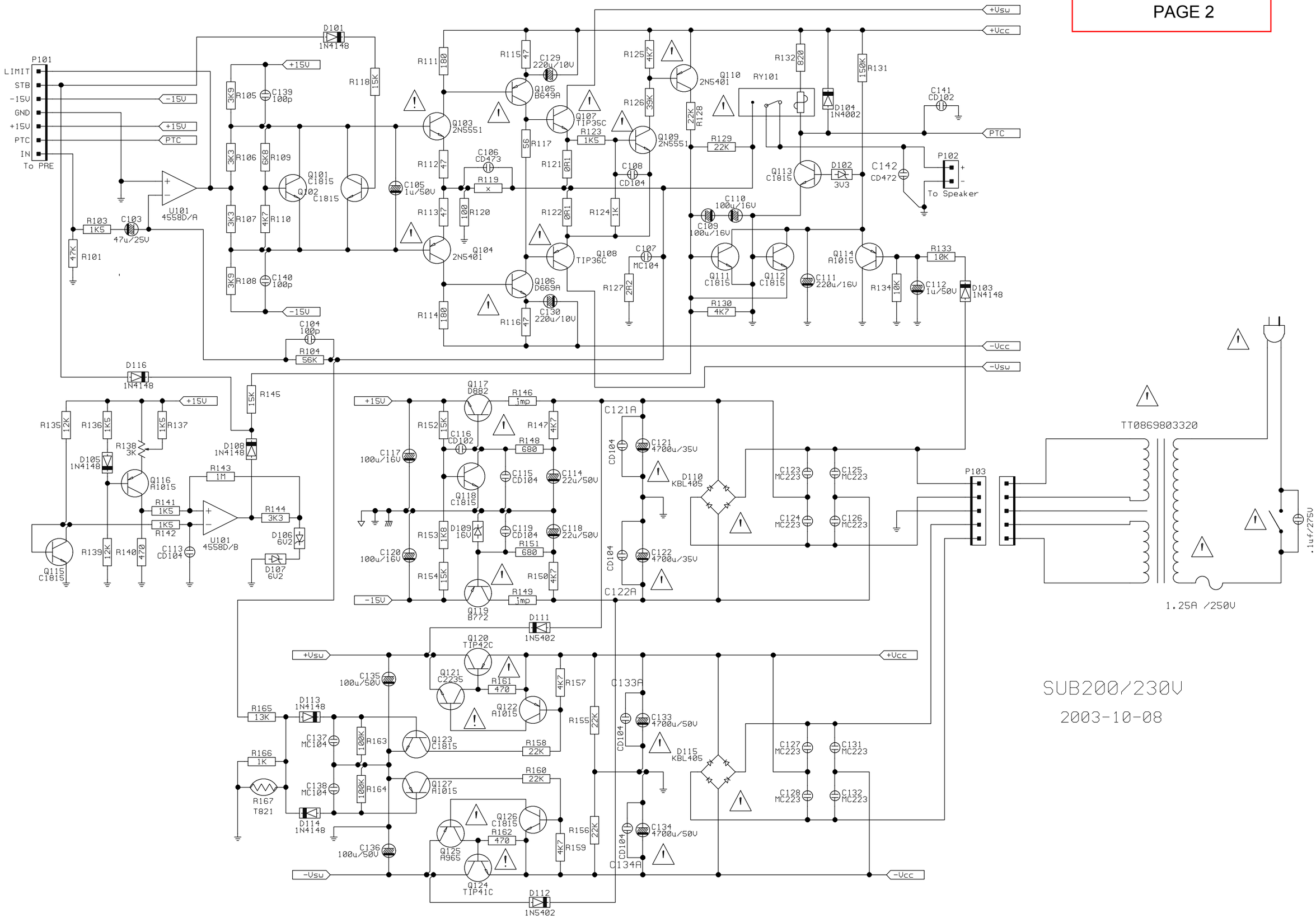
SUB200
POWER&AMP

	DRAW.		DSGN.		APVD.		FILENAME :SUB200U.SCH	REVISION :	
							MODEL NO.	1	
							DWN BY :C.S.WANG	2	
							DATE :2003-10-08	3	

230V SCHEMATICS
PAGE 1



230V SCHEMATICS
PAGE 2



SCS200.7 system

Packaging